

MASSACHUSETTS STATE REVOLVING FUND (SRF) **DIESEL RETROFIT PROGRAM**

Massachusetts Department of Environmental Protection
Division of Municipal Services/Mike Rotondi, Director
March 2002



Introduction

The Massachusetts Diesel Retrofit Program (MDRP) responds to the need to control air pollution emissions from diesel engine equipment on construction sites. Currently, most construction equipment, including backhoes, front-end loaders, cranes, and air compressors are not required to be fitted with after-engine emission controls. However, diesel engines emit high levels of nitrogen oxides, particulate matter (PM), and a complex mixture of toxic gases. Many of the gases are known or suspected cancer-causing agents. The goal of the MDRP is to help reduce adverse health impacts, such as asthma, shortness of breath and decreased lung capacity, along with citizen complaints relating to emissions from diesel engines.

The Diesel Retrofit Program began in the fall of 1998, as a cooperative effort of the Massachusetts Department of Environmental Protection (DEP), the Massachusetts Highway Department, the Executive Office of Environmental Affairs, and several private contractors (J.F. White, Jay Cashman, and Modern Continental). An agreement was reached to add after-engine control devices, such as oxidation catalysts and particulate filters, to construction equipment on the Big Dig project. The MDRP is a key component of the DEP Mobile Source Emissions Control Program, an air pollution program for cars, buses, trucks, and other vehicles.

Efforts to retrofit diesel engines with pollution control devices are gaining momentum locally and nationally. A number of state agencies, including the Massachusetts Bay Transportation Authority (MBTA), the Massachusetts Port Authority (MassPort), and numerous private project proponents are participating in MDRP. Recently, the US Environmental Protection Agency (USEPA) announced a similar national program.

SRF Program Phase-In of Diesel Retrofits

The Massachusetts Diesel Retrofit Program also has been phased into the Commonwealth's Clean Water and Drinking Water State Revolving Fund (CWSRF and DWSRF) construction program. In 2001, this applied to 50 percent of the construction equipment retrofitted. In 2002, 100 percent of construction equipment will be retrofitted.

Retrofit Technologies, Advantages, and Benefits

Oxidation catalysts and, to a lesser extent, particulate filters are the control technologies used on construction equipment by contractors participating in the MDRP. Oxidation catalysts complete the combustion of unburned fuel and reduce particulates (PM), hydrocarbon (HC), and carbon monoxide (CO) to less harmful emissions, including H₂O and CO₂. In addition, this pollution control equipment reduces toxics, such as formaldehyde and benzene, by as much as 70 percent.

Oxidation catalyst retrofits are currently the "control system of choice" of contractors and equipment operators, but particulate filters also are being utilized. The oxidation catalyst retrofit system consists of either an in-line engine muffler replacement system or an add-on control device. There are no additional operation or maintenance costs associated with the retrofits, and fuel use is not affected by the oxidation catalyst installation. Furthermore, retrofitted diesel engines do not experience any significant loss of power. Initially, this was a major concern of contractors. Another concern regarding the continuation of manufacturers' diesel engine warranties for retrofitted equipment has been

resolved with the assistance of the Manufacturers of Emission Controls Association (MECA).

The cost of reducing diesel emissions from construction equipment is small, in relation to the health effects. A retrofit – which can be accomplished in a few hours for \$400 to \$2000 per piece of equipment – is an important and cost-effective investment in cleaner air and healthy communities. In Massachusetts, more than 750,000 people suffer from lung and heart ailments that are seriously aggravated by air pollution and smog. In New England, the number of hospital visits due to asthma is 81 percent higher than the national average.

In concert with the retrofits, DEP has been recommending that project proponents require their contractors to use On-Road Low Sulfur Diesel (LSD) fuel in their Off-Road Construction equipment; LSD fuel having a sulfur content of approximately 500 ppm versus the lower grade Off-Road fuel with a sulfur content of 3,000 ppm. The use of LSD fuel, in conjunction with after-engine emission controls, can increase particulate matter (PM) removals by an additional 25 percent beyond that obtained solely with after-engine controls.

To date, more than 120 diesel engines on the Big Dig project have been retrofitted with oxidation catalysts. This represents about 25 percent of all construction equipment on the project. In the coming year, another 100 engine retrofits are expected. The resultant benefit is predicted to be a reduction of 200 tons of air pollutants. This is equivalent to eliminating 96 million truck miles or removing 1300 diesel-powered buses for a year. Over the next few years, the numerous other projects which are participating in the MDRP will result in significant increases in pollutant removals.

For More Information:

For additional information, members can contact the following DEP staff.

- ☐ ☐ Steven Lipman Phone: 617/292-5698
e-mail: Steven.Lipman@state.ma.us
- ☐ ☐ Christine Kirby Phone: 617/292-5631
e-mail: Christine.Kirby@state.ma.us

Regional SRF Contacts:

- ☐ ☐ Northeast - Donald St. Marie
Phone: (617) 292-5709
email: donald.st.marie@state.ma.us
- ☐ ☐ Southeast - Robert Cady
Phone: (617) 292-5713
email: robert.cady@state.ma.us
- ☐ ☐ Central - Gustav Swanquist
Phone: (617) 556-1083
email: gustav.swanquist@state.ma.us
- ☐ ☐ Western - Stanley Linda
Phone: (617) 292-5736
email: stanley.linda@state.ma.us

Web sites:

- ☐ DEP: www.mass.gov/dep/bwp/daqc/files/rfit823.doc
- ☐ EPA: www.epa.gov/oms/transp/vmweb/vwhvydty.htm



A publication of the Commonwealth of Massachusetts,
Executive Office of Environmental Affairs,
Department of Environmental Protection,
Bureau of Resource Protection/Outreach Services
One Winter Street, Boston, MA 02108

Massachusetts
Department of
Environmental
Protection

This information is available in alternate format upon request by contacting the
ADA Coordinator at 617/574-6872.

